

JOTTINGS FROM THE BIOLOGICAL LABORATORY OF SYDNEY UNIVERSITY.

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7.—CUTTING SECTIONS OF DELICATE VEGETABLE STRUCTURES.

There is a difficulty in obtaining by the means ordinarily recommended, without considerable pains and loss of time, a number of fine sections of such delicate vegetable structures as the prothallium of a fern, fronds of delicate seaweeds, or thin and flexible leaves of land plants; and the following method which I have found of service will recommend itself by its simplicity.

The specimens to be cut, if they have been in alcohol, are placed in water for a few hours, and then for a day in a thick solution of gum arabic; if fresh they may be placed at once in the gum. Small pieces of carrot are placed in the gum for the same length of time. The specimens [to be cut and the carrot which is to form the embedding material are now thoroughly saturated with strong gum solution. Slits are made in the pieces of carrot and the thin structures to be cut are inserted in the slits, any interstices being filled up with the gum. The blocks of carrot, with the embedded specimens, are then frozen and cut in the usual manner with the Freezing Microtome. When the sections are placed in water there is little difficulty in picking out the sections of the embedded objects from the light-coloured and flocculent sections of the carrot—an operation which is facilitated by agitation of the water, when most of the narrow needle-like sections of the thin objects will find their way to the bottom of the vessel.

8.—“VOCAL ORGANS” OF THE CICADA.

It is a very prevalent idea, and the error is repeated in nearly every manual of Zoology, that the *Cicada's* organ of voice is a wind instrument. That such could not be the case, however, a

consideration of the small bulk of the insect and the great volume of air that would be necessary in order to keep up the very loud sound produced would be sufficient to shew.

The structure of the sound-producing organs in this insect and the mode of production of the sound were correctly described by Réaumur. (1) Attention has recently been called to the subject by Mr. C. Lloyd Morgan of University College, Bristol, who, in an article in a recent number of "Nature," gives an account of some researches of his on this subject published some years ago, but apparently overlooked by recent authors of English Zoological text-books.

The sound is really produced by the bending of a stiff thin chitinous membrane strengthened by stronger narrow ribs, which is situated on the dorsal aspect of the first abdominal segment. The membrane is acted on indirectly by a powerful muscle—the largest by far that the insect possesses—which springs from the ventral side of the abdomen, and runs upwards and outwards towards the dorsal surface. This muscle ends abruptly in a transverse horny plate, from the centre of the upper surface of which a tendon passes to become inserted into a part of the frame supporting the membrane.

The loud shrill note emitted by the insect is the result of a quick succession of crackling sounds produced by the movement of the stiff membrane with its horny ribs through the agency of the muscle. Under ordinary circumstances the sounds follow one another with sufficient quickness to produce a continuous note, and this is effected, not by the contraction of the muscle as a whole, but by the successive contraction of individual fasciculi, all of which act on the horny plate, and thus the movements of the muscle on the tendon during the production of the note resemble these of the hammer-board of a piano when a number of the keys are being struck in quick succession. (2)

(1) See Pagenstecher's "Allgemeine Zoologie," III. Band, p. 143.

(2) The tense membranous drums on the *ventral* surface of the abdomen of the male *Cicada*, probably act as resonators, but their entire removal seems very little to affect the loudness of the note.